U.S. Department of the Interior U.S. Geological Survey

METAL INDUSTRY INDICATORS

June 1997

Indicators of Domestic Primary Metals, Steel, Aluminum, and Copper Activity

The primary metals leading index advanced strongly in May following a more modest gain in April. In contrast, the leading indexes for steel, primary and secondary aluminum, aluminum mill products, and copper, which are available only through April, were flat or moved lower. An examination of several components of these indexes helps to explain why the indexes moved differently in April.

The **primary metals leading index** rose 1.3% in May to 125.9 from 124.3 in April. Its 6-month smoothed growth rate, a compound annual rate that measures near-term trend, moved up to 7.0%, the highest level in 3 years, from a revised 5.2% in April. A growth rate above +1.0% usually signals increased industry activity. (An explanation of these indexes and the 6-month smoothed growth rates appears on page 12.)

The May primary metals leading index must be considered preliminary because only four of the eight leading indicators were available for its calculation. Reflecting the recent surge in the stock market, the S&P stock price index for diversified machinery made the largest positive contribution to the net increase in the May leading index. The only negative contribution to the index came from the average weekly hours worked by production workers in primary metals establishments.

In April, the **steel leading index** declined 0.7%, moving to 104.3 from a revised 105.0 in March. The largest contribution to the net decline came from the industrial production index for automotive products. According to the Federal Reserve Board, the source for the industrial production indexes, much of that drop was caused by strikes in the auto industry.

The **aluminum mill products leading index** was flat in April, holding even with the revised 143.5 in March. However, this index was also held down by strike-related decreases in the component for automotive production. Without the effects of these auto strikes, the aluminum mill products leading index would probably have risen by a small amount. The **leading index for primary and secondary aluminum** edged down 0.1% in April, dipping to 238.2 from a revised 238.4 in March. The LME spot price for aluminum and the S&P stock price index for aluminum companies had the greatest negative impact on this leading index. (Tables and charts for the primary and secondary aluminum indexes are in a separate file.)

The **copper leading index** fell 1.5% in April to 121.1 from a revised 123.0 in March. The ratio of shipments to inventories for electronic and other electrical equipment accounted for two-thirds of the index decline as that component pulled back from a record high level. However, in April this ratio stood at its third highest level since the data series began in 1958.

Although the overall primary metals leading index and the four specific metal industry leading indexes moved differently in April, much of that difference can be explained by two factors. First, the individual components of these indexes are different and second, primary metals is a broad classification covering 26 different metal processing industries.

The primary metals leading index contains the S&P stock price index for diversified machinery, which was up in April, while the stock price indexes for the specific metal industries were down. Average weekly hours were up for overall primary metals, but were down for the specific industries. Components, such as industrial production for automotive products and the ratio of shipments to inventories for electronic and other electrical equipment, which are not in the overall primary metals leading index, accounted for most of the decreases in their respective leading indexes.

All the **metal industry coincident indexes**, which measure current activity, increased in April, the latest month for which they are available. The increases ranged from 0.2% for the steel coincident index to 0.6% for the primary and secondary aluminum coincident index.

The metal industry leading indexes continue to point to moderate growth in the overall primary metals and aluminum industries, with the steel and copper industries growing at a slower pace.

Metals Price Leading Index Edges Higher

The leading index of metal prices increased 0.2% in April, moving to 96.9 from a revised 96.7 in March. Its 6-month smoothed growth rate increased to 2.8%, the highest rate in 9 months. Three of the four leading index components were available. The increase in the leading index was largely due to increased growth in the deflated M2 money supply. It more than offset a decline in the growth rate of the indicator for new housing units authorized by building permits. The growth rate of the deflated value of new orders for U.S. nonferrous metals increased slightly, but not enough to make a significant contribution to the April leading index. The other component of the metals price leading index, the growth rate of the Organization for Economic Cooperation and Development (OECD) total leading index, was available only through March, when it edged down slightly. The metals price leading index signals significant changes in price growth an average of 7 months in advance.

The growth rate of the deflated value of nonferrous metal products inventories held in the United States rose in April, the first increase in 8 months. However, this 1-month increase was slight and does not necessarily mean that the downward trend in nonferrous metal inventories is ending.

The metals price leading index and the trend in inventory growth suggest that most metal prices could grow slowly over the coming months. It is important to recognize that the business cycle and inventories are only two factors in price determination. Other factors that affect prices include changes in metals production, speculation, strategic stockpiling, and production costs.

Correction: Footnote 1 in last month's issue stated that the OECD is composed of 25 nations. There are now 29 nations in the OECD.

Table 1.
Leading Index of Metal Prices and Growth Rates of the Nonferrous Metals Price Index, Inventories of Nonferrous Metal Products, and Selected Metal Prices

		Six-Month Smoothed Growth Rates				
	Leading Index of Metal Prices (1967=100)	MII Nonferrous Metals Price Index	U.S. Nonferrous Metal Products Inventories (1982$)	Primary Aluminum	Primary Copper	Steel Scrap
1996						
April	95.6r	-9.2	4.8	-12.5	-9.9	-4.8
May	95.0r	-12.8	3.8	-14.1	-16.6	1.1
June	95.2r	-29.3	6.1	-21.6	-45.4	-2.2
July	95.5	-24.1	10.6	-16.6	-39.9	-7.6
August	95.3r	-20.9	10.7	-15.6	-33.3	-5.8
September	94.8	-26.8r	10.1	-23.5	-37.6	-1.3
October	94.6r	-21.1	8.2	-16.6	-31.7	-13.3
November	95.0r	2.1r	5.6	-2.8	11.8	-26.3
December	95.4r	-6.9	3.2r	-2.0	-11.2	-21.8
1997						
January	96.3r	6.5	-1.3	9.8	6.6	-6.6
February	96.6r	11.0	-2.3	12.7	10.5	3.7
March	96.7r	10.4	-5.6r	10.1	11.2	-3.3
April	96.9	9.7	-4.9	10.8	12.2	-8.5
May	NA	18.4	NA	11.0	30.7	2.0

r *- Revised*

Note: The components of the Leading Index of Metal Prices are the 6-month smoothed growth rates of the following: 1, the deflated value of new orders for nonferrous metals; 2, the OECD leading index, total; 3, the index of new private housing units authorized; and 4, the deflated value of U.S. M2 money supply. The Metal Industry Indicators (MII) Nonferrous Metals Price Index measures changes in end-of-the-month prices for primary aluminum, copper, lead, and zinc traded on the London Metal Exchange (LME). The steel scrap price used is the price of No. 1 heavy melting. Inventories consist of the deflated value of finished goods, work in progress, and raw materials for U.S.-produced nonferrous metals and nonferrous metal products. Six-month smoothed growth rates are based on the ratio of the current month's index or price to its average over the preceding 12 months, expressed at a compound annual rate.

Sources: U.S. Geological Survey (USGS); American Metal Market (AMM); the London Metal Exchange (LME); the Bureau of the Census; and the Organization for Economic Cooperation and Development (OECD).

Link To:

Chart 1.

Table 2.
The Primary Metals Industry Indexes and Growth Rates

	Leading Index		Coincident Index	
	(1977 = 100)	Growth Rate	(1977 = 100)	Growth Rate
1996				
June	120.5r	3.1r	107.4r	2.7r
July	119.6r	1.1r	107.9r	3.3r
August	120.1r	1.7r	108.6r	3.8r
September	120.0r	1.3r	108.8r	3.7r
October	120.2r	1.4r	109.5r	4.4r
November	120.5	1.6r	109.1r	3.3r
December	121.8r	3.3r	109.5r	3.5r
1997				
January	121.9	3.1r	109.6r	3.1r
February	123.0r	4.1	110.1r	3.4r
March	123.8r	5.0	110.2r	3.0r
April	124.3	5.2r	110.8	3.6
May	125.9	7.0	NA	NA

r *- Revised*

Note: Growth rates are expressed as compound annual rates based on the ratio of the current month's index to the average index during the preceding 12 months.

Table 3.
The Contribution of Each Primary Metals Index Component to the Percent Change in the Index from the Previous Month

Leading Index	**April**	**May**
1. Average weekly hours, primary metals (SIC 33)	0.2r	-0.8
2. S&P stock price index, machinery, diversified	0.1r	1.2
3. Ratio of price to unit labor cost (SIC 33)	0.0	NA
4. JOC metals price index growth rate	-0.1r	0.2
5. New orders, primary metals, (SIC 33) 1982$	0.2	NA
6. Index of new private housing units authorized by permit	0.0	NA
7. Growth rate of U.S. M2 money supply, 1992$	0.2	NA
8. Purchasing Managers' Index	-0.1r	0.6
Trend adjustment	0.0	0.0
Percent change (except for rounding differences)	0.5r	1.2

Coincident Index	**March**	**April**
1. Industrial production index, primary metals (SIC 33)	0.0r	0.0
2. Total employee hours, primary metals (SIC 33)	0.1	0.1
3. Value of shipments, primary metals, (SIC 33) 1982$	-0.2	0.4
Trend adjustment	0.1	0.1
Percent change (except for rounding differences)	0.0r	0.6

Sources: Leading: 1, Bureau of Labor Statistics; 2, Standard & Poor's; 3, Center for International Business Cycle Research, Bureau of Labor Statistics, and Federal Reserve Board; 4, Journal of Commerce; 5, Bureau of the Census and U.S. Geological Survey; 6, Bureau of the Census and U.S. Geological Survey; 7, Federal Reserve Board, Conference Board, and U.S. Geological Survey; and 8, National Association of Purchasing Management. Coincident: 1, Federal Reserve Board; 2, Bureau of Labor Statistics and U.S. Geological Survey; 3, Bureau of the Census and U.S. Geological Survey. All series are seasonally adjusted, except 2, 3, and 4 of the leading index.

NA*: Not available* ***r*** *- Revised*

Note: A component's contribution, shown in Tables 3, 5, 7, and 9, measures its effect, in percentage points, on the percent change in the index. Each month, the sum of the contributions plus the trend adjustment equals (except for rounding differences) the index's percent change from the previous month.

Links To:

Chart 2.

Chart 3.

Table 4.
The Steel Industry Indexes and Growth Rates

	Leading Index		Coincident Index	
	(1977 = 100)	Growth Rate	(1977 = 100)	Growth Rate
1996				
May	103.7r	2.2r	98.3	2.0r
June	103.9	2.0	98.8	2.7
July	103.0r	-0.2	99.1r	3.0r
August	102.6r	-1.0r	98.8r	1.9r
September	102.5	-1.2r	98.8r	1.6r
October	101.9	-2.2r	99.1r	2.0r
November	102.6r	-0.8r	98.4r	0.3r
December	103.3r	0.5r	98.9	1.2
1997				
January	103.7r	1.2r	99.6r	2.2
February	104.4	2.3	99.2r	1.2r
March	105.0r	3.2r	99.3r	1.1r
April	104.3	1.6	99.5	1.1

r *- Revised*

Note: Growth rates are expressed as compound annual rates based on the ratio of the current month's index to the average index during the preceding 12 months.

Table 5.
The Contribution of Each Steel Index Component to the Percent Change in the Index from the Previous Month

Leading Index	**March**	**April**
1. Average weekly hours, blast furnaces and basic steel products (SIC 331)	0.1	-0.1
2. New orders, steel works, blast furnaces, and rolling and finishing mills, 1982$, (SIC 331)	0.0	0.3
3. Shipments of household appliances, 1982$	0.0	-0.1
4. S&P stock price index, steel companies	0.0	-0.1
5. Industrial production index for automotive products	0.1	-0.6
6. Growth rate of the price of steel scrap (#1 heavy melting, $/ton)	-0.1	-0.1
7. Index of new private housing units authorized by permit	0.1r	-0.1
8. Growth rate of U.S. M2 money supply, 1992$	0.1	0.2
9. Purchasing Managers' Index	0.2	-0.1
Trend adjustment	0.0	0.0
Percent change (except for rounding differences)	0.5r	-0.7
Coincident Index		
1. Industrial production index, basic steel and mill products (SIC 331)	-0.1r	0.0
2. Value of shipments, steel works, blast furnaces, and rolling and finishing mills (SIC 331), 1982$	0.0	0.2
3. Total employee hours, blast furnaces and basic steel products (SIC 331)	0.1	-0.1
Trend adjustment	0.1	0.1
Percent change (except for rounding differences)	0.1r	0.2

Sources: Leading: 1, Bureau of Labor Statistics; 2, Bureau of the Census and U.S. Geological Survey; 3, Bureau of the Census and U.S. Geological Survey; 4, Standard & Poor's; 5, Federal Reserve Board; 6, Journal of Commerce and U.S. Geological Survey; 7, Bureau of the Census and U.S. Geological Survey; 8, Federal Reserve Board, Conference Board, and U.S. Geological Survey; and 9, National Association of Purchasing Management. Coincident: 1, Federal Reserve Board; 2, Bureau of the Census and U.S. Geological Survey; 3, Bureau of Labor Statistics and U.S. Geological Survey. All series are seasonally adjusted, except 4 and 6 of the leading index.

NA*: Not available* ***r*** *- Revised*

Links To:

Chart 4.

Chart 5.

Table 6.
The Aluminum Mill Products Industry Indexes and Growth Rates

	Leading Index		Coincident Index	
	(1977 = 100)	Growth Rate	(1977 = 100)	Growth Rate
1996				
May	139.4	4.1	123.5r	1.9
June	139.8r	3.8r	121.8	-0.8
July	139.2	2.3	123.2r	1.5r
August	139.5r	2.1r	124.2r	3.0r
September	141.1	4.1	125.4	4.6r
October	138.4r	0.1r	123.8	1.8r
November	140.0r	2.0r	124.4r	2.5r
December	140.6r	2.7r	124.5r	2.5r
1997				
January	141.7	3.9	123.0r	-0.2r
February	143.7r	5.9	125.6r	3.2r
March	143.5r	4.8r	125.6r	2.7r
April	143.5	4.0	126.1	3.2

r *- Revised*

Note: Growth rates are expressed as compound annual rates based on the ratio of the current month's index to the average index during the preceding 12 months.

Table 7.
The Contribution of Each Aluminum Mill Products Index Component to the Percent Change in the Index from the Previous Month

Leading Index	**March**	**April**
1. Average weekly hours, aluminum sheet, plate, and foil (SIC 3353)	0.2	-0.5
2. Index of new private housing units authorized by permit	0.1r	-0.1
3. Industrial production index for automotive products	0.1	-0.7
4. Construction contracts, commercial and industrial (square feet)	-0.7	0.6
5. Net new orders for aluminum mill products (pounds)	-0.4	0.4
6. Growth rate of U.S. M2 money supply, 1992$	0.2r	0.2
7. Purchasing Managers' Index	0.2r	-0.1
Trend adjustment	0.1	0.1
Percent change (except for rounding differences)	-0.2r	-0.1
Coincident Index		
1. Industrial production index, aluminum sheet, plate, and foil (SIC 3353)	0.2r	0.0
2. Total employee hours, aluminum sheet, plate, and foil (SIC 3353)	0.1	-0.2
3. Shipments of aluminum mill products (pounds)	-0.4r	0.5
Trend adjustment	0.1	0.1
Percent change (except for rounding differences)	0.0r	0.4

Sources: Leading: 1, Bureau of Labor Statistics; 2, Bureau of the Census and U.S. Geological Survey; 3, Federal Reserve Board; 4, F.W. Dodge, Division of McGraw-Hill Information Systems Company; 5, The Aluminum Association, Inc. and U.S. Geological Survey; 6, Federal Reserve Board, Conference Board, and U.S. Geological Survey; 7, National Association of Purchasing Management. Coincident: 1, Federal Reserve Board; 2, Bureau of Labor Statistics and U.S. Geological Survey; 3, Bureau of the Census and U.S. Geological Survey. All series are seasonally adjusted.

NA: Not Available *r - Revised*

Links To:

Chart 6.

Chart 7.

Table 8.
The Copper Industry Indexes and Growth Rates

	Leading Index		Coincident Index	
	(1977 = 100)	Growth Rate	(1977 = 100)	Growth Rate
1996				
May	119.2	3.2	112.5r	0.9r
June	118.2r	1.1r	112.5r	0.8r
July	117.9r	0.6	112.9r	1.4r
August	117.8r	0.2r	112.3	0.2r
September	118.0	0.3r	113.8r	2.7r
October	118.4	0.8r	115.1r	4.4
November	120.2r	3.5r	113.3r	1.0
December	119.7r	2.2r	114.4r	2.8
1997				
January	119.7	2.0	113.6r	1.1r
February	121.5	4.4	114.1r	1.8r
March	123.0r	6.2r	113.8	1.0r
April	121.1	2.6	114.2	1.4

r *- Revised*

Note: Growth rates are expressed as compound annual rates based on the ratio of the current month's index to the average index during the preceding 12 months.

Table 9.
The Contribution of Each Copper Index Component to the Percent Change in the Index from the Previous Month

Leading Index	**March**	**April**
1. Average weekly overtime hours, rolling, drawing, and extruding of copper (SIC 3351)	0.3	-0.4
2. New orders, nonferrous and other primary metals, 1982$	0.0r	0.1
3. MII stock price index, copper companies	0.2	-0.3
4. Ratio of shipments to inventories, electronic and other electrical equipment (SIC 36)	0.7	-0.9
5. Growth rate of the LME spot price of primary copper	0.0	0.0
6. Index of new private housing units authorized by permit	0.1r	-0.1
Trend adjustment	0.0	0.0
Percent change (except for rounding differences)	1.3r	-1.6
Coincident Index		
1. Industrial production index, primary smelting and refining of copper (SIC 3331)	-0.1	0.1
2. Total employee hours, rolling, drawing, and extruding of copper (SIC 3351)	0.0r	-0.2
3. Copper refiners' shipments (short tons)	-0.2r	0.4
Trend adjustment	0.1	0.1
Percent change (except for rounding differences)	-0.2	0.4

Sources: Leading: 1, Bureau of Labor Statistics; 2, Bureau of the Census and U.S. Geological Survey; 3, U.S. Geological Survey; 4, Bureau of the Census and U.S. Geological Survey; 5, London Metal Exchange and U.S. Geological Survey; 6, Bureau of the Census and U.S. Geological Survey. Coincident: 1, Federal Reserve Board; 2, Bureau of Labor Statistics; 3, American Bureau of Metal Statistics, Inc. and U.S. Geological Survey. All series are seasonally adjusted, except 3 and 5 of the leading index.

NA*: Not available* ***r*** *- Revised*

Links To:

Chart 8.

Chart 9.

Explanation

Each month, the U.S. Geological Survey tracks the effects of the business cycle on five U.S. metal industries by calculating and publishing composite indexes of leading and coincident indicators. Wesley Mitchell and Arthur Burns originated the cyclical-indicators approach for the economy as a whole at the National Bureau of Economic Research in the mid-1930's. Over subsequent decades this approach was developed and refined, mostly at the National Bureau, under the leadership of Geoffrey H. Moore.[1]

A business cycle can briefly be described as growth in the level of economic activity followed by a decline succeeded by further growth. These alternating periods of growth and decline do not occur at regular intervals. Composite indexes, however, can help determine when highs and lows in the cycle might occur. A composite index combines cyclical indicators of diverse economic activity into one index, giving decision makers and economists a single measure of how changes in the business cycle are affecting economic activity.

The indicators in the metal industry leading indexes historically give signals several months in advance of major changes in a coincident index, a measure of current metal industry activity. Indicators comprising the leading indexes are, for the most part, measures of anticipations or new commitments to various economic activities that can affect the metal industries in the months ahead.

Composite coincident indexes for the metal industries consist of indicators for production, shipments, and total employee hours worked. As such, the coincident indexes can be regarded as measures of the economic health of the metal industries.

Three of the metal industry coincident indexes, those for primary metals, steel, and aluminum mill products, reflect their classifications in the U.S. Standard Industrial Classification (SIC). The SIC is the main classification used by the United States government and industry in collecting and tabulating economic statistics. Two of the coincident indexes, one for copper and one for primary and secondary aluminum, are blends of two different copper and aluminum industries, respectively.

Of the five metal industries, primary metals is the broadest, consisting of twenty-six different metal processing industries. The steel, aluminum, and copper industries are parts of the primary metals industry.

The metal industry leading indexes turn before their respective coincident indexes an average of 9 months for primary metals, 8 months for steel, and 7 months for copper. The average lead time for the leading indexes of aluminum mill products and primary and secondary aluminum is 6 months.

[1]**Business Cycle Indicators, A monthly report from The Conference Board** (March 1996).

The leading index of metal prices, also published in the Metal Industry Indicators, is designed to signal changes in a composite index of prices for primary aluminum, copper, lead, and zinc traded on the London Metal Exchange. On average, this leading index indicates significant changes in price growth about 8 months in advance.

The growth rate used in the Metal Industry Indicators is a 6-month smoothed growth rate at a compound annual rate, calculated from a moving average. Moving averages smooth fluctuations in data over time so that trends can be observed. The 6-month smoothed growth rate is based upon the ratio of the latest monthly value to the preceding 12-month moving average.

$$\left[\left(\frac{\text{current value}}{\text{preceding 12 - month moving average}}\right)^{\frac{12}{6.5}} - 1.0\right] * 100$$

Because the interval between midpoints of the current month and the preceding 12 months is 6.5 months, the ratio is raised to the 12/6.5 power to derive a compound annual rate.

The growth rates measure the near-term industry trends. They, along with other information about the metal industries and the world economy, are the main tools used to determine the outlook of the industries. A 6-month smoothed growth rate above +1.0% usually means increasing growth; a rate below -1.0% usually means declining growth.

The next summary is scheduled for release on MINES FaxBack at 10:00 a.m. EDT, Friday, July 18. Access MINES FaxBack from a touch-tone telephone attached to a fax machine by dialing 703-648-4999. The address for Metal Industry Indicators on the World Wide Web is: http://minerals.er.usgs.gov/minerals/pubs/mii/

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